TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The I-64 corridor serves between 35,000 and 100,000 vehicles daily for commuting, vacationing and transporting goods. However, in five years it will be performing an additional service – expressway to American History. The United States and the World will be celebrating the 400th Anniversary of the first permanent settlement by European explorers in the New World at Historic Jamestowne. This year-long celebration is expected to bring millions of additional visitors to Virginia - particularly the Williamsburg-Tidewater-Richmond areas. These visitors will be arriving by various modes of transportation - airplanes, trains, buses and automobiles. In all cases, these visitors will be traveling on Virginia's highway system at some point and time.

Richmond and Hampton Roads contain major airports visitors will be using to access Historic Jamestowne as well as additional lodging and dining facilities. It is anticipated that many people will stay in these areas and drive the 30 to 45 miles to Historic Jamestowne. While several smaller routes connect these areas with Historic Jamestowne, it is anticipated that most visitors will use Interstate 64 (I-64). A smooth, pleasant ride will allow visitors to focus on the festivities. When the visitors leave and return home, they will be salesmen and saleswomen for the Historic Jamestowne celebration and Virginia. Comments will be on their wonderful experience; however, unless the ride quality and condition of the I-64 corridor is addressed – their comments may include Virginia's road conditions.

STUDY PURPOSE

In July 2002, VDOT initiated an effort to evaluate the existing pavement on I-64 from Richmond to Newport News recognizing the importance of ride quality. This effort was divided into two phases. The purposes of the study were to qualify and quantify the existing pavement conditions, to determine pavement needs, to prioritize sections for improvement, and to make rehabilitation recommendations. In order to perform the study, two phases of work were completed. Phase I involved an initial pavement investigation, corridor segmentation, and preliminary corridor improvement cost estimate. The results of this phase's work were provided in a report dated August 2002 (Interstate 64 – Phase I Corridor Study Report). Phase II involved a more detailed pavement evaluation, maintenance/rehabilitation activity selection, detailed section cost estimate, and project scheduling. This information is documented in this final report. This report can be used as a resource supporting funding for the improvement of the I-64 Corridor.

REVIEW OF PHASE I

For Phase I, the scope of work included a network level pavement evaluation and the development of network level pavement rehabilitation needs and costs. Being a network level analysis, several pavement rehabilitation options were developed. For Phase I, the following tasks were performed:

Task 1 – Network Level Visual Condition and Ride Quality Survey (Data Analysis)
Task 2 – Corridor Segmentation
Task 3 – Network Level Rehabilitation Needs and Costs
Task 4 – Phase I Report

Data Analysis

The field data collected for this study was used to assess the functional conditions of the pavement as well as provide an initial assessment of the pavement's structural condition. The functional condition was determined from visual condition surveys and ride quality testing; the structural condition was evaluated based on the presence of certain pavement distresses.

Corridor Segmentation

For most pavement evaluation projects – large or small, the project must be divided into smaller homogeneous sections for further analysis. These sections may be considered homogeneous based on pavement type, typical section, and/or condition. Interstate 64 was divided based on pavement type and typical section for the majority of the 155-centerline miles under evaluation. These criteria were selected based on initial visual evaluations of the corridor and the relatively consistent condition for each pavement type. In all, the I-64 was divided into 24 sections – 13 in the eastbound direction and 11 in the westbound direction.

Maintenance and Rehabilitation Options

The last task in the Phase I study was developing preliminary maintenance and rehabilitation options for each section. Three timeframes were used for developing these options:

- 5 Year Service Life
- 10 – 15 Year Service Life
- 20+ Year Service Life

These timeframes were selected to provide a short-term corrective maintenance, medium-term rehabilitation and long-term rehabilitation. Based on the preliminary estimates, the cost to improve the I-64 corridor could range from $29 Million for all short-term maintenance improvements to $97 Million for all long-term rehabilitations. The medium-term rehabilitation estimate is $50 Million.

Conclusion

Overall, the AC surfaced sections of I-64 are in the best condition. These AC surfaces are less than 10 years old, exhibit limited distresses, and have "good" to "excellent" ride quality. Unlike AC surfaces, JRCP and CRCP surfaces are over 30 years old. The corridor sections with these surfaces have extensive pavement failures and "fair" to "very poor" ride quality. Given the scheduled maintenance, portions of I-64 in the Six-Year Program, and the amount of pavement in good condition, the preliminary cost estimate for pavement related items should be between $29 and $50 Million.

PHASE II SCOPE OF WORK AND TASKS

On 22 August 2002, the I-64 Corridor Study Evaluation Team presented the results of the Phase I evaluation to members of VDOT's upper management. During this meeting, the scope of the Phase II evaluation was refined and the tasks were established. The scope of work included:

- Detailed corridor evaluation (pavement and road-side assets),
- Development of a corridor maintenance and rehabilitation strategy,
- Selection of section maintenance/rehabilitation activities with associated costs, and
- Recommended timing for section activities.

Unlike Phase I, the study limits for Phase II were reduced. The limits for Phase I started at the I-295 and I-64 Interchange at Milepost 178.3 and terminated near the Bland Boulevard overpass at Milepost 253.7. For Phase II, the start of the evaluation was moved to the Shockhoe Valley Bridge just east of I-95 at Milepost 191.25. This was done for several reasons – reduce the cost of the corridor improvement, more non-pavement related improvements required west of I-95 to accommodate an overlay, and I-95 makes a logical break point.

For Phase II the following tasks were performed:

Task 1 – Detailed Patching Survey for Each Section
Task 2 – Structural Pavement Analysis
Task 3 – Selection of Section Maintenance and Rehabilitation Activities with Costs
Task 4 – Corridor Schedule Development

All data and recommendations were linked to corridor sections. These sections were the same as the Phase I sections with the exceptions of those sections not included in the Phase II study. For ease of referencing and the division of some Phase I sections, the sections were given number identification codes. The codes do not distinguish between districts, only direction. The corridor sections are presented in Table 1.

Section ID (Phase I Section ID)	From MP (Description)	To MP/Description	PAVEMENT TYPE[1]
1E (R7E)	MP 191.2 (East End Shockhoe Valley Bridge)	MP 193.61 (Mechanicsville Turnpike)	CRCP
2E (R7E)	MP 193.61 (Mechanicsville Turnpike)	MP 196.05 (Laburnum Avenue Overpass)	CRCP
3E (R8E)	MP 196.05 (Laburnum Avenue Overpass)	MP 197.05 (Oakley Lane Overpass)	JRCP
4E (R8E)	MP 197.05 (Oakley Lane Overpass)	MP 205.44 (Henrico/New Kent County Line)	JRCP
5E (R9E)	MP 205.44 (Henrico/New Kent County Line)	MP 224.69 (New Kent/James City County Line)	Composite (AC on CRCP)
6E (H10E)	MP 224.69 (New Kent/James City County	MP 231.00	Composite (AC on JRCP)

Section ID (Phase I Section ID)	From MP (Description)	To MP/Description	PAVEMENT TYPE[1]
	Line)		
7E (H11E)	MP 231.00	MP 237.60 (Exit 238)	AC
8E (H12E[2])	MP 237.60 (Exit 238)	MP 242.25 (Exit 242)	Composite (AC on JRCP) and JRCP
9E (H13E)	MP 242.25 (Exit 242)	MP 253.7 (New PCC Pavement and 3 Lane Section)	JRCP
1W (R6W)	MP 191.2 (East End Shockhoe Valley Bridge)	MP 193.61 (Mechanicsville Turnpike)	CRCP
2W (R6W)	MP 193.61 (Mechanicsville Turnpike)	MP 196.05 (Laburnum Avenue Overpass)	CRCP
3W (R7W)	MP 196.05 (Laburnum Avenue Overpass)	MP 197.05 (Oakley Lane Overpass)	JRCP
4W (R7W)	MP 197.05 (Oakley Lane Overpass)	MP 205.44 (Henrico/New Kent County Line)	JRCP
5W (R8W)	MP 205.44 (Henrico/New Kent County Line)	MP 224.69 (New Kent/James City County Line)	Composite (AC on CRCP)
6W (H9W)	MP 224.69 (New Kent/James City County Line)	MP 231.00	Composite (AC on JRCP)
7W (H10W)	MP 231.00	MP 237.60 (Exit 238)	AC
8W (H11W)	MP 237.60 (Exit 238)	MP 242.25 (Exit 242)	Composite (AC on JRCP) and JRCP
9W (H11W)	MP 242.25 (Exit 242)	MP 253.7 (New PCC Pavement and 3 Lane Section)	JRCP

Notes:
1. Pavement Type: CRCP – Continuously Reinforced Concrete Pavement; JRCP – Jointed Reinforced Concrete Pavement; AC – Asphalt Concrete Pavement; Composite – AC on Concrete Pavement
2. I-64 Innovative Technologies Section not included in Study

Table 1 – Corridor Sections

The referencing in Table 1 was used in the remainder of the report.

Task 1 – Detailed Patching Survey for Each Section

For Phase I, a limited patching survey was performed to estimate the required patching for the initial cost estimates. In Phase II, a detailed patching survey was performed on 100% of the pavement surface in each travel lane. It should be noted that bridge decks, ramps and shoulders were not surveyed. To determine the patching locations, sizes and types, a patching guide was developed. Table 2 summarizes the amount of PCC patching for each section.

Section ID	Type I PCC Patch (SY)	Type II PCC Patch (SY)	Type III PCC Patch (SY)	Type IV-A PCC Patch (SY)
1E[1]				3,440
3E	937		28	

Section ID	Type I PCC Patch (SY)	Type II PCC Patch (SY)	Type III PCC Patch (SY)	Type IV-A PCC Patch (SY)
4E	3,953	676	151	
9E	8,224	161	108	
1W[1]				3,440
3W	442		7	
4W	3,149	1,663	108	
8W	1,423	39	6	
9W	1,350			
Total	*19,478*	*2,539*	*350*	*6,880*

Notes:

1. Patching quantities were estimated for Sections 1E and 1W based on 10% of the surface area.
2. I-64 Innovative Technologies Section not included in Study

Table 2 – PCC Patching Summaries

For the AC surfaced sections, the pavement was in good to excellent condition based on the results of the Phase I survey; therefore, a pavement patching survey was not performed. However, for cost estimating purposes it was assumed 5 percent of the entire AC material depth would have to be removed and replaced due to AC material deterioration. This assumption was in line with the procedures outlined in VDOT's "Guidelines for Pavement Life Cycle Cost Analysis" Version 1.0 dated May 2002. For the composite pavement sections, only minimal repairs should be required on the underlying PCC based on the AC surface. Table 3 contains the estimated AC patching quantities.

Section ID	Estimated AC Patching (SY)	Estimated AC Patching (Tons)
5E	13,580	3,096
6E	4,442	1,012
7E	4,646	3,178
5W	13,580	3,096
6W	4,442	1,012
7W	5,364	3,669
Total	*46,056*	*15,063*

Table 3 – AC Patching Summaries

Task 2 – Structural Pavement Analysis

As part of the I-64 pavement evaluation, a structural analysis was performed to determine the structural condition of the jointed concrete, composite and flexible pavement sections. The results of this analysis were used in determining the maintenance and rehabilitation activities for each section.

<u>Subtask 2.1 FWD Testing</u>

In July and August, 2002, nondestructive deflection testing was conducted using the state owned and operated falling weight deflectometer (FWD) to develop an understanding of the structural condition of the pavement (See Figure 1). Testing was only conducted between MP 173 and MP 254 in the outside lane for both directions. For the jointed concrete pavement sections, pavement basin testing and joint load transfer testing were performed. On the continuously reinforced concrete, composite and flexible pavement sections, basin testing was performed. Impulse loads of 6,000, 9,000, and 16,000 pounds were applied to the pavement and the resulting deflections were recorded at radial distances of 0”, 8”, 12”, 18”, 24”, 36”, 48”, 60” and 72” measured from the center of the load plate.

Figure 1 – VDOT FWD

Subtask 2.2 Structural Analysis

Using deflection and load data collected with the FWD and structure information for the test sections, the structural conditions for the pavement was evaluated. Following methods outlined in the 1993 AASHTO Guide, the existing load transfer efficiency was estimated for the jointed concrete pavement sections. For the composite pavement sections, the existing subgrade strength (k – composite modulus of subgrade reaction) was calculated. For the flexible pavement sections, the effective structural number (SNeff) and layer moduli were computed. These results are provided in the following sections.

Preliminary Analysis to Determine Core Locations

In order to perform a structural analysis, the pavement structure must be known. For the jointed concrete pavement sections, previous coring operations measured the PCC thickness to be approximately 9 inches thick. Less information was known about the AC thickness for the composite pavement and flexible pavement sections. Therefore, limited coring was performed in Sections 5E, 6E, 7E, 5W, 6W and 7W. These results of the coring are presented in Table 3. This data in conjunction with existing information was used in the structural analysis.

Section ID	AC Thickness (in.)	Base Type	Base Thickness (in.)	Stripping Present
5E	4.25	PCC	8	Limited to Moderate
6E	5	PCC	9	No
7E	17	Stone/Sand	7	Yes – Bottom AC Layer
5W	4.35	PCC	8	Limited to Moderate
6W	4.75	PCC	9	No
7W	13.5	Stone/Sand	7	Yes – Bottom AC Layer

Table 2 – I-64 Pavement Structures

For Section 5E, the AC overlay thickness was relatively consistent. However, for Section 5W the overlay thickness varied by more than 1.5" along the section's length. This variation in thickness can be attributed to the AC material problems that have existed over the last 10 years. Several sections have exhibited AC stripping and have had to be repaired. In some instances a thicker AC overlay was placed.

Summary of FWD Results – Joint Load Transfer:

Overall, the average load transfer for all sections was fair; however, there was a large standard deviation for most of the sections (greater than 35%). The large standard deviation was expected due to the number of patches that have been placed to restore load transfer between the slabs. Many of these patches were in poor visual condition and had low load transfer efficiency. Finally, the majority of the jointed concrete pavement has been in service since the late 1960's.

Section ID	Number of Tests	Avg. LT (%)	Std. Dev LT (%)	CV LT (%)[(a)]	Condition of Joints (Number)		
					Good	Fair	Poor
3E	20	62	23	37	7	6	7
4E	141	52	22	43	36	40	65
9E	141	67	24	35	65	31	45
3W	20	61	14	22	9	7	4
4W	139	50	23	42	43	36	60
8W	106	50	23	47	26	17	63
9W	85	57	24	43	29	20	36

Notes:
(a) CV LT – Coefficient of Variance for the Load Transfer Efficiency of the transverse joints. Higher the percentage, more variation in the section.

Table 3 – Load Transfer (LT) Results

Following the guidelines established by AASHTO for assigning load transfer (J-) factors for design purposes, each joint tested was identified as "Good", "Fair" or "Poor". "Good" joints have a load transfer efficiency greater than 70%. "Fair" joints have a load transfer efficiency between 50% and 70%. "Poor" joints have a load transfer efficiency less than 50%. For all sections the number of joints that were considered "fair" or "poor" exceeded the number of joints that were considered "good". With testing being conducted at night in July and August, the lower load transfer efficiency values were expected due to the colder temperatures as compared to the daytime. However, if this testing were to have been conducted in the Winter, then the number of joints with "fair" or "poor" load transfer efficiencies would probably be greater due to the contraction of the PCC slabs. Table 3 summarizes the number of joints in each condition per section:

Overall, with the large amount of truck traffic (12 percent) and the possible voids that exist under the corners of the slabs (based on testing conducted in February 2002), the "fair" to "poor" load transfer efficiency was expected.

Summary of FWD Results – Basin Testing (Composite Pavement):

To characterize the structural condition of the prepared base and native subgrade, mid-slab basin testing was conducted. Following procedures outlined in Appendix L of the 1993 AASHTO Pavement Design Guide, the static composite modulus of subgrade reaction was estimated. Overall, the average static k value was low for Sections 6E and 6W – 121 and 111 pci respectively. Typically, the analysis approach in Appendix L over estimates the elastic modulus of the concrete slab. This will result in a reduced subgrade support value. While the AASHTO pavement design process for rigid pavements is not greatly sensitive to the k-value, the use of the estimated k-values for these sections may result in a conservative pavement design. For Sections 5E and 5W, the average static k value was more than twice that of Sections 6E and 6W. Based on information gathered during previous evaluations and knowledge of the native soils for New Kent and James City Counties, the FWD testing results reflect anticipated conditions.

Section ID	**Number of Tests**	**Avg. k (pci)**	**Std. Dev. k (pci)**	**CV k (%)** [(a)]
5E	277	257	66	26
6E	126	121	56	46
5W	240	250	67	27
6W	77	111	47	42

Notes:
(a) CV k – Coefficient of Variance for the composite modulus of subgrade reaction. Higher the percentage, more variation in the section.

Table 4 – Basin Testing Results (Composite)

Closer examination of the static k values identified the reason for the higher coefficients of variation in the Section 6E and 6W sections. The portion of those sections near the New Kent County Line were higher; further east in the section the values would decrease. However, even in the western part of the sections, the static k-values were less than those values in Sections 5E and 5W.

Summary of FWD Results – Basin Testing (Flexible Pavement):

Only a small portion of I-64 from Richmond to Newport News has a flexible pavement structure, approximately 11 centerline miles in James City County. For this short section, FWD basin testing was performed to assess the effective structural number of the AC layers and aggregate base along with the elastic modulus for the subgrade.

Testing was conducted at approximately 425-foot intervals. Pavement coring locations were selected based on preliminary analysis of the FWD data. In the eastbound direction, 7E, the average structure was – 17 inches AC with 7-inch sand/stone base. In the westbound direction, 7W, the average structure was – 13.5 inches AC with 7-inch sand/stone base. This pavement information was used for the structural analysis. Table 5 presents the results of the structural analysis.

Section ID	Number of Tests	Avg. Sneff	Std. Dev. SNeff	CV SNeff (%) [(a)]	Avg. Mr (psi)	Std. Dev. Mr (psi)	CV Mr (%) [(b)]
7E	44	5.84	0.37	6	29,200	5,900	20
7W	48	5.78	0.50	9	27,900	6,800	24

Notes:
(a) CV SNeff – Coefficient of Variance for the Effective Structural Number. Higher the percentage, more variation in the section.
(b) CV Mr – Coefficient of Variance for the Subgrade Resilient Modulus. Higher the percentage, more variation in the section.

Table 5 – Basin Testing Results (Flexible)

Section 7E had a slightly higher effective structural number, but this is probably a function of the thicker AC thickness. Overall, the results for Section 7E and 7W indicated equivalent pavement sections. Subsequent pavement designs using these results indicated a mill and replace of the AC surface was necessary to provide a 20-year structural pavement life.

Task 3 – Selection of Section Maintenance and Rehabilitation Activities with Costs

During the Phase I portion of the study, several short, medium and long-term maintenance and rehabilitation strategies were identified for the corridor. Short-term strategies must provide between 5 and 10 years of service life; medium-term must provide between 10 and 15 years; long-term must provide more than 20 years of service. These strategies were based on the existing pavement type and condition. Once the candidate strategies were identified, each section of I-64 was analyzed to determine which strategies were applicable. Table 6 lists the strategies considered for each pavement type.

Pavement Type	**Strategy**		
	Short-Term	**Medium Term**	**Long-Term**
Rigid – CRCP	Patch and Thin Hot Mix AC Overlay	Patch and 3.5” AC Overlay	Patch and 5.5” AC Overlay
Rigid – JRCP	Patch and Grind;	Patch and 4.5” AC	Reconstruction

Pavement Type	**Strategy**		
	Short-Term	**Medium Term**	**Long-Term**
	Patch, Grind and Thin Hot Mix AC Overlay	Overlay	
Flexible	Patch; Patch and Thin Hot Mix AC Overlay	Patch and AC Overlay; Patch, Mill and Replace AC Overlay	Reconstruction
Composite	Patch; Patch and Thin Hot Mix AC Overlay	Patch and AC Overlay; Patch, Mill and Replace AC Overlay	Reconstruction

Table 6 – Candidate Maintenance and Rehabilitation Strategies

Table 7 contains the recommended maintenance and rehabilitation activities per section along with the estimated costs (in 2002 dollars).

Section Number	**Recommended Strategy**	**Estimated Cost (2002 dollars)**	**Comment**
1E	Patch and 3.5” AC Overlay	$2.38M	
1W	Patch and 3.5” AC Overlay	$2.17M	
2E	Patch and 3.5” AC Overlay	-	Currently Under Construction
2W	Patch and 3.5” AC Overlay	-	Currently Under Construction
3E	Patch and 4.5” AC Overlay	$1.15M	One Mile Section of JRCP not in Six Year Plan
3W	Patch and 4.5” AC Overlay	$0.74M	One Mile Section of JRCP not in Six Year Plan
4E	Patch, Grind and Thin Hot Mix AC Overlay	$4.40M	Six Year Plan – Design Only
4W	Patch, Grind and Thin Hot Mix AC Overlay	$4.36M	Six Year Plan – Design Only
5E	Patch, Mill and Replace AC Overlay	$7.14M	Limited Stripping in AC Overlay; 15% Full Depth Mill and Replace
5W	Patch, Mill and Replace AC Overlay	$6.71M	Limited Stripping in AC Overlay; 15% Full Depth Mill and Replace
6E	Patch, Mill and Replace AC Overlay	$1.57M	Limited Stripping in AC Overlay; 5% Full Depth Mill and Replace
6W	Patch, Mill and Replace AC Overlay	$1.60M	Limited Stripping in AC Overlay; 5% Full Depth Mill and Replace
7E	Patch, Mill and Replace AC Overlay	$1.66M	Limited Stripping in AC Overlay; 5% Full Depth Mill and Replace
7W	Patch, Mill and Replace AC	$1.91M	Limited Stripping in

Section Number	Recommended Strategy	Estimated Cost (2002 dollars)	Comment
	Overlay		AC Overlay; 5% Full Depth Mill and Replace
8E	Patch and 4.5" AC Overlay	-	Innovative Technologies Section
8W	Patch and 4.5" AC Overlay	$1.98M	
9E	Patch, Grind and Thin Hot Mix AC Overlay	$5.47M	Six Year Plan – Design Only
9W	Patch, Grind and Thin Hot Mix AC Overlay	$3.07M	Six Year Plan – Design Only

Table 7 – Selected Strategy and Cost Per Section

Cost estimates for each section included the pavement related activities, the traffic engineering items (stripping, rumble strips, guardrail) and a mobilization fee (5%). Additionally, engineering costs (12% of the construction estimate) and a contingency (10% of the construction estimate) were applied to each section's estimate. Since the major cost items were included in the section estimate, these cost estimates should be within 10% of the actual cost at time of construction. Minor cost items such as transitions into ramps, replacement of sign posts, and environmental permits were not included. Overall, the I-64 Corridor Cost Estimate for the pavement sections was $46 million in 2002 dollars. Appendix A contains the cost estimate spreadsheets.

Bridge Deck Considerations

While the major focus of this study was on the existing pavement condition and how to provide a smooth, safe riding surface, the travelers using I-64 must traverse several bridges between Richmond and Newport News. These bridges have decks in varying conditions, many of which need repair in order to improve the ride quality. In the Richmond District, eleven bridges will require repair. The repair method would include patching the existing deck and laying a thin hot mix AC material over the entire surface. No bridges were identified for deck replacement. The estimated cost in the Richmond District was $2,588,000.

Like the Richmond District, the Hampton Roads District has twenty-three bridge decks in need of repair. The estimated cost for the Hampton Roads District was $789,000. The costs are composed of repainting, patching, epoxy overlays and other minor repairs.

Total bridge deck improvement costs are estimated at $3.38 million in 2002 dollars.

Task 4 – Corridor Schedules

With the amount of work required to improve I-64 and the estimated cost, all sections cannot be scheduled in the first year. Therefore, the work must be scheduled over a four-year period starting in the 2003 construction season and completing in the 2006 construction season. Table 8 list the year each section will be awarded for construction. For the sections with exposed concrete, the time to complete the construction may take two years. This is due to the amount of PCC patching required and the scheduling of the thin hot mix AC overlay.

Construction Year	**Section**	**Estimated Cost**
2003	1E	$2,461,000
	1W	$2,249,000
	5W	$6,944,000
	9W	$3,174,000
Sub-Total		*$14,828,000*
2004	3E	$1,230,000
	5E	$7,655,000
	3W	$791,000
	4W	$4,670,000
Sub-Total		*$14,346,000*
2005	4E	$4,878,000
	9E	$6,074,000
	8W	$2,195,000
Sub-Total		*$13,147,000*
2006	6E	$1,802,000
	7E	$1,907,000
	6W	$1,836,000
	7W	$2,186,000
Sub-Total		*$7,731,000*
Corridor Total		**$50,052,000**

Table 8 – Corridor Schedule and Costs

The individual section costs for the corridor are inflated depending on the construction year. A compounded interest rate of 3.89% was used. This is consistent with VDOT's new cost estimating system for new construction projects. For the bridges, the cost could range from $3.5 million (2003) to $3.9 million (2004) depending on the year the contract for each district bridge contract is awarded.

CONCLUSIONS

In 2007, Virginia, the United States and the World will be celebrating the 400th Anniversary of the Jamestown Settlement – the first permanent European Settlement in North America. To recognize this anniversary, a year-long celebration will occur not only in Historic Jamestowne, but a major portion of southeastern Virginia. Many visitors will be traveling along Virginia's highway to history (I-64); therefore, it is important to provide a smooth, safe, functional riding surface.

Currently, I-64 is in varying states of condition along it's length. The concrete pavement portions closer to Richmond and Newport News are in the worst condition while the sections with an asphalt concrete surface (between Richmond and Newport News) are in good condition. The conditions of the bridge deck vary. To repair the pavement surfaces and the bridge decks, approximately $50 million is required over the next four years. These repairs would include pavement and bridge deck patching, placing thin hot mix AC overlays, epoxy overlays, and milling and replacing AC overlays.

APPENDIX – COST ESTIMATES